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EXAMINER

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ART UNIT	PAPER NUMBER
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1626

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## DETAILED ACTION

Claims 1-56 are pending in the application.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buysch et al. {U.S. Pat. 5,856,554}, and Mizukami et al. {U.S. Pat. 5,380,907}, or alternatively, in view of Pressman et al. {U.S. Pat. 5,760,272} and Pressman et al. {U.S. Pat. 6,114,564}.

The instant application claims a process for the production of diaryl carbonates, diphenyl carbonate, by the reaction of an aromatic hydroxy compound (e.g., phenol), with carbon monoxide and oxygen in the presence of a catalyst composition comprising a Group 8, 9 or 10 metal (e.g., palladium), at least one salt, at least one metal co-catalyst, and,

optionally, an activating solvent, and where the reaction is commenced at a temperature sufficient to <sup>keep</sup> ~~kept~~ the aromatic hydroxy compound molten.

Further, the reaction is performed under various other conditions, such as when the temperature or pressure is increased, when the CO (carbon monoxide) and O<sub>2</sub> (oxygen) is mixed, and when it is introduced, etc.

Buysch et al. teach a process for the production of diaryl carbonates by the reaction of an aromatic hydroxy compound with CO and O<sub>2</sub> in the presence of a catalyst composition comprising platinum, a metal co-catalyst, a quaternary salt, and a base. The temperature and pressure are within the scope of the instant claimed invention. Further, Buysch et al. teach that it is advantageous to conduct the process under conditions where the starting hydroxy compound is in a melt with diaryl carbonate, (column 2, lines 42 through column 3, lines 16; and Examples 1-6).

Buysch et al. do not teach that an activating solvent may be present or the preference of palladium in the catalyst composition. However, Mizukami et al., or alternatively one of the Pressman et al. references do teach the preference of the metal catalyst as palladium and further

teaches that the process is conducted in the presence of an activating compound, e.g., a solvent, that is within the scope of that taught in the instant application. In Mizukami et al., the activating solvent is a nitrile compound (column 2, lines 43-44; and column 3, lines 6-17); in Pressman et al. '272, the activating solvent is N-methylpyrrolidone (column 4, lines 53-56); and in Pressman et al. 564, the activating solvent is an ether (column 4, lines 17-46).

The difference of the combined references is that the Buysch et al. reference teaches <sup>that</sup> the diphenyl carbonate (DPC) is present in the initial melt with the hydroxy compound. However, since this is the only variation of the instant application from the bulk of the prior art, all other parameters being equal to that known in the art, it would have been obvious to combine the known art, and making slight variations in order to provide an optimized process. Therefore, one skilled in the art would have been motivated to combine the prior art references to arrive at the instant claimed process since the various catalyst compositions are well known in the art for the production of diaryl carbonates, and to

provide an optimized process. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the references and modify the prior art, given the state of the art at the time the invention was made, in order to optimize the process absent a showing of unexpected results. Therefore, the instant claimed invention would have been suggested to one skilled in the art.

### *Response to Arguments*

Applicants' arguments filed September 27, 2002 have been fully considered. Applicants argue that the yields of the diaryl carbonate products of Buysch et al. are less than the yields of the instant claimed invention. In response, Applicants' argument has been considered but has not been found persuasive. Applicants have not demonstrated, in a side-by-side comparison, that the instant claimed process has unexpected, beneficial and superior results over the teachings of the cited prior art.

Applicants argue that the teachings of Buysch et al. are directed to a process for making diaryl carbonates which process requires the

presence of at least 20 wt % of diaryl carbonate in the reaction mixture at the start of the reaction. Applicants argue that Buysch et al. requires that a metal co-catalyst be added after the other reaction components have been treated with carbon monoxide whereas the instant invention require that the reaction components be treated with carbon monoxide before treatment with a carbon monoxide-oxygen mixture.

In response, Applicants' independent claim 1, for example, has "comprising", which is open-language. Therefore, having "at least 20 wt. % of diaryl carbonate in the reaction mixture at the start of the reaction" is embraced by the instant claims. Further, changing the order in which reactants are added is not patentable unless unexpected results are shown.

Applicants argue that there is no teaching or suggestion in Mizukami et al. of the use of a salt as a reaction component. In response, Mizukami et al. (column 3, lines 52-56; and column 4, lines 9-21) teach that the catalyst and the co-catalyst can be in the form of a salt

(e.g., palladium chloride and manganese acetate). Therefore, Mizukami et al. teach a salt component.

Applicants argue that there is no teaching or suggestion in either Pressman et al. '272 or Pressman et al. '564 of carbon monoxide treatment of the reaction mixture before treatment with a carbon monoxide-oxygen mixture. In response, each of the Pressman et al. references teaches that the carbon monoxide and the oxygen may be introduced separately or as a mixture. See column 3, lines 35-38 in Pressman et al. '272; and column 4, lines 52-56 in Pressman et al. '564.

Applicants argue that the combination of Buysch et al. and Mizukami et al. or alternatively one of Pressman et al. '272 and Pressman et al. '564 does not teach Applicants' claimed invention. Applicants argue that the combination of the references do not teach a temperature range of between about 72 °C and about 90 °C. Applicants argue that the specific examples in the prior art references do not teach or suggest Applicants' claimed invention.

All of Applicants' arguments have been considered but have not been found persuasive. Each of the cited prior art teach a process of making diaryl carbonates. Buysch et al. teach the temperature and pressures ranges of Applicants' claimed invention (column 3, lines 8-12). Further, it is well established that consideration of a reference is not limited to the preferred embodiments or working examples, but extends to the entire disclosure for what it fairly teaches, when viewed in light of the admitted knowledge in the art, to person of ordinary skill in the art. In re Boe, 148 USPQ 507, 510 (CCPA 1966). For all the reasons given above, the instant claimed invention would have been suggested to one skilled in the art.

### *Conclusion*

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of

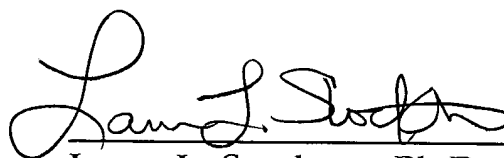


this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura L. Stockton whose telephone number is (703) 308-1875. The examiner can normally be reached on Monday-Friday from 6:00 am to 2:30 pm. If the examiner is out of the Office, the examiner's supervisor, Joseph McKane, can be reached on (703) 308-4537.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-1235.

The fax phone number for the organization where this application or proceeding is assigned is (703) 308-4556.

A handwritten signature in cursive script, appearing to read "Laura L. Stockton", written over a horizontal line.

Laura L. Stockton, Ph.D.  
Patent Examiner  
Art Unit 1626, Group 1620  
Technology Center 1600

December 16, 2002